



EUCI Presents a Web Conference on:

# PRINCIPLES OF MANAGING AGING ASSETS IN ELECTRIC UTILITY SYSTEMS

February 17, 2010



2:30 – 4:00 PM Eastern Time



EUCI is authorized by IACET to offer 0.1 CEU for this program.

# PRINCIPLES OF MANAGING AGING ASSETS IN ELECTRIC UTILITY SYSTEMS

February 17, 2010

2:30 – 4:00 PM Eastern Time

## OVERVIEW

The purpose of this webinar is to present a unified set of principles that guide the formulation of a method for managing aging assets. The method itself is presented and the data requirements of the method are described. An example of the application of the method to transmission transformers is discussed.

The objective of aging asset management in electric utilities is to minimize the cost of operating the assets while providing the customer services for which the assets exist. A policy for achieving this cost minimization can be found by application of an appropriate methodology. The methodology indicates when and under what conditions it is best to retire (and replace), repair, test, or do nothing to a particular asset.

Asset management deals with uncertainties in asset failure, asset condition, and asset testing. The management methodology is structured to control these uncertainties. That structure is presented in this webinar. The essential idea of the methodology is that the condition of an asset changes as the asset is used, hence the management policy must be based on the uncertain and dynamic asset conditions. In particular, asset hazard rates are condition-dependent. Further, knowledge gained about asset condition by testing is itself uncertain. These uncertainties are combined into a forecast of asset failure that guides asset policy.

The data requirements for the methodology are described. The methodology has been applied to many classes of assets. A transmission transformer application is given that illustrates the inputs, the methodology structure, the assumptions used in the application, and the outputs, which include the optimal policy for managing an inventory of transmission transformers.

## LEARNING OBJECTIVES

- Identify the important variables in asset management
- Formulate the asset management problem mathematically
- Specify asset condition as an uncertain, dynamic variable
- Recognize the importance of condition-dependent hazard rates
- Identify how to represent the information found in asset testing
- Integrate asset testing and test results into the optimal asset management policy
- Review what is required to find the optimal asset management policy based on asset condition, test results, and cost of failures

## INSTRUCTOR

**Charles D. Feinstein** is **Associate Professor of Operations and Management Information Systems** at the **Leavey School of Business, Santa Clara University**. Dr. Feinstein is Co-Founder of VMN Group LLC, a quantitative consulting company. He also teaches in the Department of Management Science and Engineering at Stanford University and in the Department of Industrial Engineering and Operations Research at the University of California, Berkeley. Dr. Feinstein has over 25 years of experience in research, teaching and application of mathematical methods and modeling. His areas of expertise include optimization, decision analysis, system dynamics, and systems analysis. His previous employment includes positions as a Senior Decision Analyst at Applied Decision Analysis, Inc. and as a Research Engineer at Xerox Palo Alto Research Center (PARC). He has been active in the academic and professional communities and has published more than fifty technical papers and reports (including several EPRI reports) as well as presented many lectures on both theoretical and applied research. His current interests include investment planning and risk analysis, with particular application to the electric power industry. He has written and presented extensively on managing aging infrastructure, project prioritization methodologies, and electric power distribution system risk analysis.

## IACET



EUCI has been approved as an

Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102. In obtaining this approval, EUCI has demonstrated that it complies with the ANSI/IACET Standards which are widely recognized as standards of good practice internationally.

As a result of their Authorized Provider membership status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standards.

EUCI is authorized by IACET to offer 0.1 CEU for this program.

### Requirements for Successful Completion of Program

Participants must be logged in to the web conference for its entirety to receive continuing education credit.

### Instructional Methods

Web based PowerPoint presentation and on-line interactive question/answer session.

# PRINCIPLES OF MANAGING AGING ASSETS IN ELECTRIC UTILITY SYSTEMS

February 17, 2010

2:30 – 4:00 PM Eastern Time

## PROGRAM AGENDA

1. Problem Statement
  - a. Strategic asset management
  - b. Problem importance—strategic questions
  - c. Management objective
2. Mathematical Formulation of the Asset Management Problem
  - a. Methodology objectives
  - b. Relationship of methodology to current practice
  - c. Role of uncertainty—three kinds of uncertainties in management of aging assets
    - i. Definition of uncertainties
    - ii. Consequences of errors in uncertainty analysis
3. Structure of Methodology—Four Disciplines Combined
  - a. Dynamic systems
  - b. Probabilistic analysis
  - c. Optimization
  - d. Bayesian learning
4. Dynamic Analysis of Asset Condition
  - a. Condition states
  - b. Policy complexity, problem size, structure of Policy Model
  - c. Condition-dependent hazard rates
  - d. Role of testing
  - e. Testing example
  - f. Fundamental principle of asset management policy
5. Methodology Structure
6. Data Requirements
7. Role of Mathematical Modeling and Analysis in Aging Asset Management
8. Example (Transmission Transformers)
  - a. Problem formulation
  - b. Hazard rates
  - c. Asset condition dynamics
  - d. Testing
  - e. Required inputs
  - f. Assumptions
  - g. Outputs and solution
9. Summary and Conclusions; Further Discussion

## LOGGING IN TO THE WEB CONFERENCE

After registration, each registrant will receive a confirmation of payment or an invoice, depending on method of payment. Each registrant will also receive an e-mail with appropriate login information and more information regarding the event 24 hours prior to the start of the event. To log on, you will need a broadband connection and audio system.

### WHAT IS A SINGLE SITE CONNECTION?

A site connection allows a single connection to the web conference. That connection is open to any number of users in a collaborative setting. Because there are no travel expenses and only a single registration fee is required, each additional participant lowers the cost per participant significantly.

By purchasing a site connection, you can invite as many people as you would like to view and participate in the session from a single location. Set up the session in a conference room and project the presentation and chat on a large screen. You also have rights to distribute copies of the presentation materials to everyone involved. Please note that audio is received via the computer sound system and must be broadcast to your group.

If for any reason a relevant stakeholder cannot co-locate for the session, we encourage you to include that person by purchasing an additional connection at the reduced fee of US \$195 per session. This will ensure that every member of a team receives the same relevant, timely information in the most efficient way.

If you have any technical or purchasing questions, please contact us at (201) 871-0474.

Start Time: 2:30 PM Eastern Time

United States Regional Start Times:

11:30 AM Pacific :: 12:30 PM Mountain :: 1:30 PM Central :: 2:30 PM Eastern

Use the time zone converter (<http://www.timezoneconverter.com/cgi-bin/tzc.tzc>) to find your correct start time.

register today! call (201) 871-0474

# PRINCIPLES OF MANAGING AGING ASSETS IN ELECTRIC UTILITY SYSTEMS

February 17, 2010  
2:30 – 4:00 PM Eastern Time

## REGISTRATION INFORMATION

Mail or fax this form along with payment. You will receive a confirmation and/or invoice within 48 hours. Make checks payable to PMA.

### MAIL DIRECTLY TO:

The Power Marketing Association (PMA)  
P.O. Box 2303  
Falls Church, VA 22042

### PHONE:

(201) 871-0474

### FAX TO:

(253) 663-7224

### ONLINE:

[Click Here!](#)

## REFUND / CANCELLATION POLICY

All cancellations received prior to January 29, 2010 will be subject to a US \$50 processing fee per web conference per registrant. Written cancellations received after this date will create a partial credit of the tuition good toward any other EUCI conference, publication or web conference. This credit will be valid for six months. No refunds will be given after January 29, 2010 in any case. In case of conference cancellation, EUCI's liability is limited to refund of the conference registration fee only.

## PLEASE REGISTER THE FOLLOWING

- Both Principles of Managing Aging Assets in Electric Utility Systems, February 17, 2010 and The Role of Uncertainty in Managing Aging Assets in Electric Utility Systems, February 24, 2010 Web Conferences, Single Site Connection: US \$600  
**Early Bird on or Before February 16, 2010: US \$550**
- Principles of Managing Aging Assets in Electric Utility Systems, February 17, 2010, Single Site Connection: US \$345  
**Early Bird on or Before February 16, 2010: US \$295**
- Additional Connection: US \$245,  
**Early Bird on or Before February 16, 2010: US \$195 each**  
Number of additional connections: \_\_\_\_\_

### Web Conference Presentations Available on CD:

CDs are available 48 hours after the web conference is complete. The cost per CD is US\$295 [add US\$50 for international shipments]. Upon receipt of order and payment the CD will be shipped to you.

*NOTE: All presentation CD sales are final and are non-refundable.*

- Principles of Managing Aging Assets in Electric Utility Systems CD
- The Role of Uncertainty in Managing Aging Assets in Electric Utility Systems CD

### ENERGIZE WEEKLY

When you sign up for "Energize Weekly" you will receive a new conference presentation each week via email on a relevant industry topic. The presentations are selected from a massive library of over 1000 current presentations that EUCI has gathered during its 22 years organizing conferences.

- Sign me up for "Energize Weekly"**

How did you hear about this event?  
(Direct email, Colleague, Speaker(s), etc.)

\_\_\_\_\_

Name \_\_\_\_\_ Job Title \_\_\_\_\_

E-Mail \_\_\_\_\_

Company \_\_\_\_\_ Telephone \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## PAYMENT METHOD

Please charge my credit card:  Visa  MC  AMEX  Discover Security Code \_\_\_\_\_

Visa and MC cards have a 3 digit code on the signature panel on the back of the card, following the account number. American Express cards have a 4 digit code on the front of the card, above the card number.

Name on Card \_\_\_\_\_ Signature \_\_\_\_\_

Account Number \_\_\_\_\_ Exp. Date \_\_\_\_\_

Card Holder Phone Number \_\_\_\_\_

Billing Address \_\_\_\_\_ Billing Zip Code \_\_\_\_\_

Or enclosed is a check for \$ \_\_\_\_\_ to cover \_\_\_\_\_ connections.